

Mary White	Grade level: 2nd
9/24/15	Germination

Common Core State Standards:

Structure and Function — How are organisms structured to ensure efficiency and survival?			
GRADE 2			
2.2 — Plants change their forms as part of their life cycles.			
Core Science Curriculum Framework	Grade-Level Concepts <i>Students should understand that...</i>	Grade-Level Expectations <i>Students should be able to...</i>	Assessment
2.2.a. The life cycles of flowering plants include seed germination, growth, flowering, pollination and seed dispersal.	<ol style="list-style-type: none"> 1. Flowering plants progress through a sequenced life cycle. First, seeds sprout (germinate), then seedlings grow into adult plants with leaves and flowers. If the flowers are pollinated, seeds develop that will grow into new plants to continue the life cycle. 2. Roots, stems, leaves, flowers and seeds are structures that develop during different stages of the plant's life cycle. 3. Seeds contain the beginnings of a new plant (embryo) and the food (energy source) the new plant needs to grow until it is mature enough to produce its own food. Different plant varieties produce seeds of different size, color and shape. 4. Environmental conditions, such as temperature, amount of light, amount of water and type of soil, affect seed germination and plant development. 5. A plant's seed will grow into a new plant that resembles but is not identical to the parent plant or to other new plants. For example, marigold plants produce marigold seeds that grow into new marigold plants. Individual marigolds, however, vary in height, number of leaves, etc. 6. Seedlings are young plants that produce the structures that will be needed by the plant to survive in its environment: Roots and leaves begin to grow and take in nutrients, water and air; and the stem starts to grow towards sunlight. 7. Adult plants form more leaves that help the plant collect sunlight and air to make its food. They produce flowers that are the structures responsible for reproduction. 	<ol style="list-style-type: none"> 1. Use senses and simple tools to observe and describe the roots, stems, leaves, flowers and seeds of various plants (including trees, vegetables and grass.) 2. Use magnifiers to observe and diagram the parts of a flower. 3. Describe the functions of roots, stems, leaves, flowers and seeds in completing a plant's life cycle. 4. Record observations and make conclusions about the sequence of stages in a flowering plant's life cycle. 5. Compare and contrast how seeds of different plants are adapted for dispersal by water, wind or animals. 6. Conduct a fair test to explore factors that affect seed germination and plant growth. 	<p>A19. Describe the life cycles of flowering plants as they grow from seeds, proceed through maturation and produce new seeds.</p> <p>A20. Explore and describe the effects of light and water on seed germination and plant growth.</p>

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26

Student Learning Objectives:

- Understand how to identify factors needed by seeds to germinate
- Be able to describe some major stages of plant growth

Rationale for Objective:

Students will have learned in Kindergarten that many different kinds of living things inhabit the earth. Also they learn in 1st grade that organisms change in form and behavior as part of their life cycles and that living things have different structures and behaviors that allow them to meet their basic needs.

Assessment:

Have students share the drawings of what they have observed after the growth of the lima bean. Have a discussion about "can plants grow from beans?" Students should use words to enhance their descriptions and label any parts that they feel are important to the story. Students will also have the Cool Beans Record Page, where they will record the growth of their bean over a period of time.

- Differentiation: have a student write sentences versus doing a drawing, possibly giving students an option of doing either.

Classroom Learning Environment focus:

Students will work in groups after the reading. Each group will have their soaked lima beans that they will be observing the lima beans growth in different parts of the classroom.

Instructional Model/Strategy: Group work and Inquiry

Materials:

- One copy of *Jack and the Beanstalk*
- One small dish containing several lima beans
- One roll of paper towels

For each team of three students:

- Dried lima beans
- Paper plates
- Large, resealable plastic bags
- One magnifying glass or hand lens
- Cool Beans Record Page PDF Document

Daily Formative Assessment:

Check in at the end of each content period and reflect on that day's findings and discuss using relevant vocabulary.

Differentiating Instruction:

Assess- instead of drawing their observation of the changes in the lima bean, they can describe it using words.

Teach- Have the child read versus doing a read-aloud of the book. Also potentially change lima bean to a different type of bean.

Initiation:

We will read the book *Jack and the Beanstalk* and stop at the part where he talks about his magic beans. Are they magical? Then bring in the topic of beans and seeds. Seeds grow plants do beans do too? We want to make that connection between beans and seeds, and follow up with questions to gauge their interest/knowledge. The idea is to engage the kids in a discussion to determine what knowledge they already have and build on that.

Lesson Development:

- 1) Each team will make a set of paper towel plants.
- 2) They will place their three paper towel plants in three different locations around the room. Suggest that they pick locations that will tell them something about what

conditions seeds need to germinate (such as different kinds of light or temperature).

- 3) Hand out the Cool Beans Record Page and ask students to fill it out.
- 4) Have students share with their team what they've drawn/written.
- 5) Provide each student with a soaked lima bean. Instruct students to open their beans and observe the parts they see inside. Then ask students to list the parts that they see. (Vocabulary will be listed on the board). Students will discuss what they believe each part does.
- 6) Allow teams to observe their beans for several days and to add water to them as necessary. Each day they will record measurements and draw what they are observing.
- 7) After the beans have sprouted, ask students to share their drawings and measurements with the class.
- 8) Use discussion questions to facilitate a conversation to determine if SLO was reached.

Closure:

Number 8 of the lesson development will lead the lesson into a time of closure. Ask the students questions like "Can plants grow from beans?" "What did you observe was needed to help the lima bean grow?" "Where did the lima bean grow best and where didn't it grow best?" "How is this idea different from what you thought before?" and "What new questions do you have?" Talk about the different places you can plant beans or seeds. Take a trip outside the school and talk about how the plants around the school started from beans or seeds and grew to what they are today.

Technology resources:

<https://edt415flatescience.wikispaces.com/Mary>

View the above link to bring you to the screencastomatic video (or document depending on your availability to viewing a video). It will allow to briefly fill in students that were absent during the lesson.

As part of the lesson, students will create a thinglink (example found on link above) of the seed germination process as well as the parts of a seed.